SYSTEMATIC NOTES ON MICRONESIAN PLANTS. 2.

by F. R. Fosberg

This series is designed to present material preliminary to a Flora of Micronesia (in preparation) and to validate names used in that Flora so they can be used now. (For No. 1 see Phytologia 5: 289-292, 1955). The present number contains notes and new combinations in the Piperaceae.

PIPERACEAE

The family Piperaceae is inherently a very difficult one, as are most families with reduced or simplified floral structure and many species. There is no doubt that a large number of species exist in the two principal genera, Piper and Peperomia. It was probably inevitable that the earlier workers in such a group that is common and widespread should tend to describe many species that appeared distinct on the basis of a few specimens, and that subsequent species should have been set up on similar characters. These would probably tend to fill in the gaps and the species to run together. In such a case, it is a natural tendency to continue to describe new species rather than to look critically at the increasing difficulties in telling them apart. One gets the impression that, in the Piperaceae at least, it became the course of least resistance to describe any specimen that gave trouble as new, rather than to struggle with the problem of identifying it.

Even Yuncker, who had no hesitation in combining weak species that he had studied in the field, had great compunction in reducing those that he only knew from dried material and especially those known to him from descriptions only. He also became accustomed to using the trifling characters employed by his predecessors, such as slight differences in leaf shape, pubescence, and habit, and ascribed perhaps too much importance to them.

In working over the relatively few Micronesian species for the Flora of Micronesia, the trivial nature of some of the features used to separate them became very evident, and attempts to construct a usable key were frustrating.

Some of these problems are more or less alleviated by combining species where they do not seem to represent morphologically distinct populations. To some extent this is done below. However, even this leaves certain species very difficult to separate in the field. Further field study may eventually indicate

that Peperomia glassmanii, P. kusaiensis and P. breviramula should be combined, and that Peperomia ponapensis, and P. kraemeri are cospecific with P. mariannensis. I hesitate, however, to make these reductions without an opportunity to look again at the plants in the field, now that I have better understanding of the characters that purport to separate them.

The reductions made below are discussed individually. The nomenclatural status of Piper methysticum Forst. f. is also considered. The species of Piper recognized from Micronesia in the present treatment are mostly very distinct and easily separated if fertile material is available.

PIPER L.

PIPER BETLE L., Sp. Pl. 28, 1753.

Even a cursory examination of a series of specimens of this widely planted and subspontaneous species from any part of its range shows that it is a complex of forms which seem to have little significance, although they are by no means all found throughout the range of the species. To disentangle these for the whole species would be a larger undertaking than I am prepared to attempt here. However, there seem to be three discernible entities in Micronesia, although Professor Yuncker in his treatment of the Micronesian Piperaceae (Occ. Pap. Bishop Mus. 22: 83-108, 1959) admitted only two, and those at the varietal level.

Since the differences are only trivial ones, mainly in leaf outline and presence or absence of puberulence on the nerves, and since there is no clear geographical separation, I prefer to treat the variations as formae. The necessary combinations, synonymy, and distinguishing characteristics are as follows:

PIPER BETLE L. f. BETLE

Piper betle L., Sp. Pl. 28, 1753.

Stems striate-angulate, leaf blades oblong-ovate, base oblique, subcordate or only slightly cordate, glabrous.

This seems to be the plant indicated by Linnaeus in Flora Zeylanica 11-12, 1747, which I take to be the main basis for the Species Plantarum treatment. Therefore the type locality is undoubtedly Ceylon, in spite of being indicated by Linnaeus as India.

In Micronesia this form is found in the Marianas and is known from Agrigan, Alamagan, Saipan, Rota and Guam islands.

PIPER BETLE f. MARIANUM (Opiz) Fosberg, stat. nov.

Piper marianum Opiz in Presl, Rel. Haenk. 1: 159, 1828.

Piper betle var. mariannum /sic/ C. DC. in DC., Prodr. 16(1): 360, 1869.

Piper potamogetonifolium Opiz in Presl, Rel. Haenk. 1: 156, 1828.

Stems terete, leaf blades glabrous beneath, broadly ovate-cordate, basal sinus deep, base not conspicuously oblique, apex notably acuminate.

Opiz' description of P. potamogetonifolium fits this form. The basis of the statement by Safford (Contr. U.S.N.H. 9: 355, 1905) that this plant is an "undershrub" is unknown, as Opiz gives no information as to habit. Piper betle is a climber.

In Micronesia f. marianum is known only from Saipan and Guam, in the Marianas.

PIPER BETLE f. DENSUM (Bl.) Fosberg, stat. nov.

Piper densum Bl., Verh. der Bat. Genoots. 11: 193, 1826.

Piper betle var. densum (Bl.) C. DC. in DC., Prodr. 16(1): 360, 1869.

Stems terete, leaf blades puberulent beneath, especially on the nerves, broadly, somewhat irregularly, ovate cordate, with deep basal sinus, not or slightly oblique.

Yuncker, op. cit. p. 90, has referred the puberulent Micronesian specimens here. We have not seen Blume's type, which came from Java. A specimen collected in Barrigada Village, Guam (Stone 5126) is almost imperceptibly puberulent, or papillate.

In Micronesia f. densum is known from Alamagan and Guam in the Marianas, and Palau, Yap and probably Ponape in the Carolines.

PIPER GUAHAMENSE C. DC. in DC., Prodr. 16(1): 336, 1869.

Typically this species, in Guam, is somewhat puberulent or hirtellous on the under sides of the leaves and on younger parts. In the islands to the north--Rota, Tinian, and Agrigan--it is glabrous. A glabrous plant has also been collected on Guam. Yuncker (1959) described the glabrous form as var. glabrum.

Although the ranges of the puberulent and glabrous plants are partially distinct, the trivial nature of the difference would suggest the rank of forma for them. The sheet of G.E.S. 387 in the U.S. National Herbarium is puberulent, while the sheet of the same collection in the Bishop Museum is glabrous and was part of the basis for Yuncker's variety. The latter sheet is the only basis for ascribing the glabrous form to Guam. However, there seems to be no reason to suspect an erroneous locality for the sheet.

PIPER GUAHAMENSE C.DC. f. GUAHAMENSE

Known only from Guam.

PIPER GUAHAMENSE f. GLABRUM (Yuncker) Fosberg, stat. nov.

Piper guahamense var. glabrum Yuncker, Occ. Pap. Bishop Mus. 22: 87, 1959.

Known from Guam and the Marianas Islands north of Guam.

PIPER LATIFOLIUM L. f., Suppl. Pl. 91, 1781.

Piper micronesiacum Hosokawa, Trans. Nat. Hist. Soc. Formosa 32: 387, 1942.

Kusaie, Mt. Keies, Mallens, Hosokawa 9498 (A,US, isotype)

This collection, i.e., type of P. micronesiacum Hos. was referred to P. guahamense by Yuncker, and tentatively by me. It differs in having several spikes in an axil and in being less prominently puberulent.

A. C. Smith's excellent discussion of P. latifolium and its allies (Jour. Arn. Arb. 24: 349-351, 1943) suggested looking at P. latifolium, of the South Pacific, from the Marquesas, Society, and Cook Islands west to the New Hebrides, for a plant with several spikes in an axil. Smith shows that P. latifolium is rather variable, from glabrous to puberulent on petioles and lower leaf surfaces, with petioles from about one-third to almost completely vaginate.

Material available for comparison in the U. S. National Herbarium, from Tahiti, Rarotonga, Rurutu, and the New Hebrides, mostly studied either by Smith or by Yuncker, illustrates very well this variation. The Hosokawa 9498 collection falls well within the range of variation of this material, though it is hard to compare in leaf shape, as the leaves are folded and badly pressed. It is puberulent, though less so than Grant 214

from Tahiti. The leaf blades seem slightly narrower than those of some of the South Pacific specimens, and more strongly acuminate. The petioles are from one-third to two-thirds vaginate. In other respects it matches P. latifolium, and I have now no hesitation in referring it to that species, and thus placing P. micronesiacum in the synonymy of P. latifolium. This also extends the range of P. latifolium to Micronesia. When further collections are available from Kusaie, as well as from other parts of its range, it will doubtless be possible to separate varieties or forms in this species.

PIPER HOSOKAWAE Fosberg, nom. nov.

Piper decumanum var. palauense Hosokawa, Trans. Nat. Hist. Soc. Formosa 28: 153, 1938 (non Piper palauense Hosokawa 1935)

This species was first referred to P. majusculum Bl. of Java, by Kanehira, Enum. Micr. Pl. 305, 1905. Hosokawa described it as a variety of P. decumanum L., a Moluccan and Philippine species (the name of uncertain status). It is certainly closely related to these, especially the latter. However, as species of Piper go, it seems distinct enough. It differs in its broader, much less oblong leaves, with weaker and somewhat fewer nerves, all of which arise near the base, rather than one pair from well above the base, the secondary veins, rather than extending across from one main nerve to another in a ladder-like arrangement, are well marked where they start from one nerve toward the side, but split part way across and form an anastomosing network. Hosokawa's description was very brief, contrasting it with P. decumanum. More details may be worth recording, though little material is now at hand from which to do this. Quite a few sheets were examined earlier, from Kyushu University and the Bishop Museum, but it was not realized then that the plant was so distinct from P. decumanum, so not much was recorded. These sheets are not cited below.

The leaves are broadly ovate-cordate, tending slightly to be oblong, to at least 27 x 15 cm, deeply cordate, oblique, basal lobes sometimes overlapping, petiole about 3 cm long, winged part way up; pistillate spike elongate, about 6 cm thick, ovaries conspicuously drawn out to a neck at summit, stigmas 3, tomentulose, spreading, pointed.

Endemic to the Palau Islands, so far as known.

Caroline Islands, Palau: Peliliu, Hosokawa 9226 (A, BISH, isotype); Akoru-kaigan, Hosokawa 7098 (A, BISH).

Named for Prof. T. Hosokawa, of Kyushu University, who has devoted much attention to Micronesian Piperaceae.

PIPER METHYSTICUM Forst. f.,De Pl. Esc. Oc. Austr. 76: 1786.

The name Piper methysticum has been almost universally applied to the widespread Pacific shrub with leaf-opposed spikes from which the Polynesians, some Melanesians, and the eastern Carolinians of Micronesia make or made a drink called variously kava (Polynesia), yangona (Fiji) or sakau (Ponape). The root is also a pharmaceutical item in some western countries.

The existence of an earlier effectively published Piper methysticum L.f. (Suppl. Pl. 91, 1781) raises the question of the legitimacy of Foster's name. Linnaeus filius published P. methysticum with a description, applying clearly to a species with axillary spikes. In an emendandum at the end of the volume he says, "Pag. 91. Piper methysticum lege Piper latifolium."

J. W. Moore (Occ. Pap. Bishop Mus. 10(19): 3-4, 1934) dealt with this question. He chose to accept an author's right to correct his own errors and suggested regarding P. methysticum L.f., thereby, as never having been published at all, leaving us free to use P. methysticum Forst. f.

A. C. Smith (Jour. Arn. Arb. 24: 349, 1943) and Merrill (Bot. Cook's Voy. 357, 1954) following him, considered that P. methysticum L.f. was in synonymy, therefore not validly published.

This is certainly a practical and in this case, at least, an acceptable solution. It is necessary, however, to examine the case in terms of the present International Code of Botanical Nomenclature, especially to determine carefully whether or not P. methysticum L.f. constitutes an earlier homonym of P. methysticum Forst. f.

If the earlier of the two names is regarded as validly, as well as effectively, published, then whether or not the author is permitted to correct his "error", it is an earlier homonym. There is in Art. 73 of the Montreal Code limited authority to correct orthographic errors. However, this is in no sense an orthographic error, so Art. 73 does not apply. The best way under the Code, to permit such corrections made by the author at the time of original publication, seems to be to invoke Art. 34, provision No. 1, which says, "A name is not validly published (1) when it is not accepted by the author who published it." Linnaeus filius' instruction to the reader,in the emendandum, to read P. latifolium for P. methysticum can logically be considered as rejection, hence non-acceptance of the latter name. Therefore, it is not validly published and cannot be regarded as published at all

in the sense of the Code. Hence it is not an earlier homonym of P. methysticum Forst. f., which we may continue to use in its traditional sense.

PEPEROMIA R. & P.

PEPEROMIA MARIANNENSIS C.DC., DC. Prodr. 16(1): 442, 1869.

Peperomia guamana C.DC., Phil. Jour. Sci.Bot. 9: 72, 1914.

Although there is a considerable range of variation in a number of characters in the Peperomia population of the Marianas, there seems to be little correlation between these variations. P. guamana has been maintained as distinct from P. mariannensis on the basis of opposite, obtuse leaves in the latter, vs. alternate acute ones in P. guamana. However, the isotype sheet of P. guamana in USNH has predominantly opposite, though acute, leaves as has Bryan 1116 (NY). Hosaka 3008 (BISH) is about intermediate in both characters, and could easily be referred to P. mariannensis though Yuncker called it P. guamana. Stone 4713 has opposite, mostly acute leaves.

The conclusion, after examination of a good series of specimens, is that only one species is represented in the Marianas. Its correct name is P. mariannensis C.DC. Dr. B. C. Stone (ms. 1966) has quite independently arrived at the conclusion that these two species should be combined.

As Yuncker has pointed out, plants of this species from the northern Marianas tend to be larger in stature than those from Guam. However, this is only a tendency and is correlated with nothing else. I agree with Yuncker in not regarding it as meriting taxonomic recognition.

Distinction from P. kraemeri C.DC. is a more difficult problem. About the only differences seem to be the smaller generally obtuse leaves and shorter spikes of P. kraemeri. However, I have had little chance to study the glabrous Palau material referred here. It seems also very close to P. palauensis C.DC., so that reduction might require bringing the latter in, too. So for the present these may be regarded as three very closely related species. Glabrous plants from Palau referred by Yuncker to P. guamana seem to fit in P. kraemeri with no difficulty and are so disposed of here. Part of Fosberg 25869, from Urukthapel, Palau, is appressed hirtellous and seems to belong to P. palauensis, the glabrous remainder to P. kraemeri.

PEPEROMIA MARIANNENSIS C. DC. f. MARIANNENSIS

Peperomia mariannensis C. DC., sensu stricto.

This form is known from Agrigan, Pagan, Alamagan, Sarigan, Saipan, Tinian, Agiguan, Rota, and Guam.

PEPEROMIA MARIANNENSIS f. SAIPANA (C. DC.) Fosberg, comb. nov.

Peperomia saipana C. DC. in Merr., Phil. Jour. Sci. Bot. 9:72, 1914.

Peperomia guamana var. saipana (C. DC.) Yuncker, Occ. Pap. Bishop Mus. 14(2): 15, 1938.

A form with hirtellous stems occurs on Saipan and possibly Tinian (Hosokawa 8023, cited by Yuncker as from Pagan, is really from Saipan according to an itinerary supplied by Professor Hosokawa). This was originally proposed as a species by C. de Candolle, reduced to varietal rank by Yuncker, but seems nothing more than a form, since it differs only in the slight hairiness and has no discreet geographic range, as f. mariannensis also occurs on Saipan and Tinian.

C. de Candolle, in his original descriptions of P. saipana, said specifically that it is glabrous. If this were the case, it would be strictly a synonym of f. mariannensis and a new name would be needed for the hirtellous form. However, Yuncker examined the type of P. saipana in the Berlin herbarium, now presumably destroyed. Since he then used the epithet saipana for the hirtellous plant, we may, I think, safely assume that the Fritz specimen that de Candolle described was hirtellous.

PEPEROMIA PONAPENSIS C. DC., Bot. Jahrb. 56: 504, 1921.

Peperomia volkensii C. DC., op. cit. p. 503.

Peperomia gibbonsii C. DC., op. cit. p. 504.

What have been regarded as three species, all glabrous, have been recognized from low elevations in the eastern Caroline and Marshall Islands. I have collected two of them and have been struck by their similarity in habit and appearance, as well as in habitat. P. ponapensis is found on the basalt ruins at sea level at Matalanim, Ponape, as well as under atoll conditions in several of the Marshall Islands. P. volkensii grows on the similar basalt ruins in Kusaie at Lele, and has been reported from Ebon Atoll, southern Marshalls. P. gibbonsii was originally described from Ailinglapalap, in the Marshalls, supposedly from "basalt" rocks (an impossibility in the Marshalls, which are all coral).

Dried specimens of P. ponapensis and P. volkensii differ only in that those of P. volkensii have the leaves more predominantly opposite, but both species have both opposite and alternate on the same plant. Both have a tendency to have a branch (or at least a leaf scar (P. ponapensis) opposite a leaf where the leaves are alternate.

An examination of Yuncker's descriptions of the two shows that they are essentially identical except that P. volkensii has the leaves predominantly opposite while P. ponapensis has them predominantly alternate.

P. gibbonsii has not been recollected since the original gathering. The characters cited as differentiating it from P. ponapensis at first sight seem impressive. However, Yuncker's illustration of the type does not suggest that the spikes are much more "umbellate" or paniculate than those of some specimens of P. volkensii (Fosberg 26538) or of P. ponapensis (Hatheway 849, Glassman 2650, Fosberg 34027, Anderson 3745, etc.). Yuncker (1938) says P. gibbonsii has "stigma divided to form two fleshy, pilose pads" while in 1959 he says of P. gibbonsii "Bilobulate stigmas occur not infrequently among other species, but this character is especially noticeable in the type specimen of this species." Unfortunately this specimen was probably lost with the Berlin Herbarium during World War II.

There seems to be little point in straining to keep these populations as separate species, or even separate varieties, if they appear to be the same thing and must be distinguished by such inconstant features as have been used heretofore. Hence I am regarding the names as synonymous. All three were published simultaneously and, because P. ponapensis has been the most widely used name, it is here chosen for the combined species.

PEPEROMIA PONAPENSIS C.DC. var. PONAPENSIS

Peperomia ponapensis C.DC. sensu stricto

Found in the eastern Carolines (Ponape, Pingelap and Kusaie) and central to southern Marshalls (Lae, Ailinglapalap, Arno, Jaluit and Ebon atolls). The records from the Marianas (Saligan and Saipan) admitted by Yuncker are here referred to the very similar P. mariannensis.

PEPEROMIA PONAPENSIS var. TRUKENSIS (Yuncker) Fosb. comb. nov.

Peperomia trukensis Yuncker, Occ. Pap. Bishop Museum 14: 23-24, 1938.

A more or less hirtellous but otherwise entirely similar plant from Truk and the Jokaj Peninsula on Ponape seems to belong to this species also, though it has heretofore been regarded as a distinct species. The stems, leaves and peduncles are very sparsely to densely beset with short, straightish, subappressed to spreading hairs, and the leaf margins are ciliolate all the way around. It is here regarded as a variety of P. ponapensis.